

MAY 08 2002

TECH CENTER 1600/2900

WHAT IS CLAIMED IS:

36. A method of producing biochips comprising the steps of:  
arranging a plurality of capillaries having bottom open ends disposed at predetermined spacing so that said open ends are adjacent to and above a planar substrate, said open ends having diameters which prevent biomolecules from dropping down by force of gravity under non-depositing condition;

providing said biomolecules in said plurality of capillaries;  
providing polymerase chain reaction to amplify said biomolecules within said plurality of capillaries;

applying a voltage across said plurality of capillaries and said substrate during a depositing condition to allow said biomolecules to move downward by force of attraction through said open ends to deposit said biomolecules on sites on said substrate at space intervals coinciding with said predetermined spacing of said plurality of capillaries; and

stopping applying of said voltage during said non-depositing condition so that said biomolecules are held within said plurality of capillaries by surface tension at said open ends which is greater than said gravity; whereby

accurate efficient control of said voltage applying causes uniform and reliable deposits of said biomolecules on said substrate.

37. The method of claim 36, wherein said polymerase chain reaction is performed by atmospheric temperature change or by heating with laser irradiation.

NEW APPENDIX "A"

38. An apparatus for producing biochips comprising:

a plurality of capillaries having bottom open ends arranged at a same spacing interval as that of sites on a planar substrate disposed below said open ends of said plurality of capillaries, said open ends having diameters which prevent biomolecules contained within said plurality of capillaries from falling down by force of gravity under normal non-depositing state;

amplifying means for providing polymerase chain reaction to amplify said biomolecules within said plurality of capillaries;

adjusting means for adjusting a gap formed between said open ends of said plurality of capillaries and said planar substrate by moving either said plurality of capillaries or said planar substrate, or both;

transfer means for transferring said biomolecules from said plurality of capillaries to said sites on said planar substrate during said depositing state, and for enabling said biomolecules to remain in said plurality of capillaries during said non-depositing state, said transfer means comprising:

voltage means for applying voltage across said plurality of capillaries and said planar substrate so that biomolecules contained in said plurality of capillaries and usually held therein by surface tension at said open ends are deposited by force of attraction onto said sites of said planar substrate; and

stopping means for stopping applying voltage so that said surface tension of said open ends causes said biomolecules

NEW APPENDIX "B"

---

40. The method of claim 36, wherein said biomolecules are separated from said open ends of said plurality of capillaries as extremely marginal droplets and then dribbled and deposited onto said substrate.

c1 41. The apparatus of claim 38, wherein said voltage means causes said biomolecules to be separated from said open ends of said plurality of capillaries as extremely marginal droplets and then dibbled and deposited onto said substrate.

---